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Procedia - Social and Behavioral Sciences 97 (2013) 596 – 601

Procedia
Social and Behavioral Sciences

The 9th International Conference on Cognitive Science

Interactive based secured online organizational culture audit system

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Abstract

Organization culture represents the set of values, beliefs, underlying assumptions, expectations and norms that define how employees think, decide and perform. The focal issue associated with organizational culture is its association with organizational performance. This proposed online organizational culture audit system should be further secured using a facial recognition element where the system could recognize the human face using the camera and only then allows the authorize user to operate the system. The system will be developed using the Human Factors and Human Computer Interactions (HCI) approach to ensure usability and user friendliness of user when interacting with the system. The combination of recognition and interactions in augmented way will give birth to a new type of system that conforms to Human Factors need and provides user with a new computing experience that contains text and graphical information.

Keywords: Audit; interaction; facial recognition; organizational culture

1. Introduction

The idea of online auditing is a method used to collect culture related data from organizational employees, process and analyze the data immediately to produce an organizational culture report in a paperless environment. It will allow continuous auditing which could be an integral part of this information system. The system should be able to produce audit report within a short period after the data entry by the auditee. It should consume much less time and should be more cost effective. At every stage there should be controls and checking mechanism put in placed, the output could be generated, verified and later authenticated by the auditors. An online system [7] refers to a system that provides a permanent connection to the network system to both the organization and the auditors. Computer security auditing constitutes an important part of any organization's security procedures. Because of the many inadequacies of the curren manual system, thorough and timely auditing is often difficult to attain. The importance of effective computer security measures has become increasingly a concern with the advent of recently publicized intrusion attempts and virus attacks.

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doi:10.1016/j.sbspro.2013.10.278

2. Literature Review

2.1. Organizational Culture

Organizational culture represents the set of values, beliefs, underlying assumptions, expectations and norms that define how people actually think, decide and perform [8]. In a study by [3], he found that the strength of culture was important in determining short time performance, when performance was defined with broad indicators like return on assets, return on investment and return on sales. [5] a follow up study also found the supporting evidence that strong culture was predictive of short-term company performance. Similarly, past studies have shown that organizations with their culture aligned to their strategies, mission and vision, they are likely to outperform their competitors. In addition Schein's [8] definition suggests that a leader who hopes to implement a radical departure from the "norm" in an organization will need to influence, and finally change the culture, before leading a successful organization to greater heights.

2.2. Facial Recognition Algorithm

Some facial recognition algorithms identify facial features by extracting landmarks, or features, from an image of the subject's face. For example, an algorithm may analyze the relative position, size, and/or shape of the eyes, nose, cheekbones, and jaw. These features are then used to search for other images with matching features [10]. Other algorithms normalize a gallery of face images and then compress the face data, only saving the data in the image that is useful for face detection. A probe image is then compared with the face data [10]. One of the earliest successful systems [1] is based on template matching techniques applied to a set of salient facial features, providing a sort of compressed face representation.

2.3. Interaction

Ericson & Olwal [4] have utilized a physics engine to control the interactive virtual objects. The physics engine makes sure that the rendered geometry is contained in the front space frustum to exclude the issues. This method does not interact naturally with the objects in the simulation. Recently, Burigat & Chittaro [2] introduced a system, which allows the user to touch the objects of interest in the 3D representation of the city using a finger and stylus. When the user touches an object in the 3D world, the system retrieves the corresponding available data where the entire information about the object is stored locally on the device in XML files. The freezing interaction techniques [6] were designed for use with a tracked handheld tablet display with an attached camera and rely on "freezing" the frame for later editing.

3. Interactive based Online Organizational Culture Audit System

The idea of an interactive based Online Organizational Culture Audit system is that it should be a highly secured auditing system where the organization can audit their culture interactively and less time consuming. This section presents the core components of the to be Online Organizational Culture Audit system and an interaction method, which will be implemented in this audit system.

3.1. Video Capture

Video capturing is the first step in this to be audit system. PC's web camera will be used as a video capturing device. Microsoft Direct X camera API (Application Protocol Interface) is a part of Microsoft Windows system. The camera capture video image using camera API.

3.2. Facial Recognition for Security purpose

This proposed organizational culture audit system will also use a facial recognition feature to capture the organizational members where the system will be able to recognize the human face using the camera and only allow

recognized authorize user to enter the system. . Thus the system needs to use some open source facial algorithm to recognize the human face. Recognition algorithms can be divided into two main approaches, geometric, which look at distinguishing features, or photometric, which is a statistical approach that distils an image into values and compares the values with templates to eliminate variances. Principle Component based Analysis (PCA) and Linear Discriminant Analysis (LDA) facial recognition algorithm is chosen to build the system initially.

3.2.1. Principle Component based Analysis (PCA)

Principal component analysis (PCA) is a mathematical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components. Generally, PCA is using eigenfaces for facial recognition. Eigenfaces are a set of eigenvectors used in the computer vision problem of human face recognition. The approach of using eigenfaces for recognition was developed by Sirovich and Kirby [9] and used in face classification. A set of eigenfaces can be generated by performing a mathematical process called principal component analysis (PCA) on a large set of images depicting different human faces. PCA is mathematically defined as an orthogonal linear transformation that transforms the data to a new coordinate system such that the greatest variance by any projection of the data comes to lie on the first coordinate (called the first principal component), the second greatest variance on the second coordinate, and so on.

3.2.2. Linear Discriminant Analysis (LDA)

Linear discriminant analysis (LDA) and the related Fisher's linear discriminant are methods used in statistics, pattern recognition and machine learning to find a linear combination of features which characterizes or separates two or more classes of objects or events. LDA is closely related to ANOVA (analysis of variance) and regression analysis, which also attempt to express one dependent variable as a linear combination of other features or measurements. Discriminant analysis is also different from factor analysis in that it is not an interdependence technique: a distinction between independent variables and dependent variables (also called criterion variables) must be made.

Consider a set of observations (also called features, attributes, variables or measurements) for each sample of an object or event with known class y. This set of samples is called the training set. The classification problem is then to find a good predictor for the class y of any sample of the same distribution (not necessarily from the training set) given only an observation.

3.3. Organizational Culture Audit Framework

The framework for organizational culture audit as shown in Figure 1, indicates the importance of identifying the “gaps” through diagnosing the existing culture and the desired organizational culture. The audit report should detailed out recommendations on how to reduce the “gaps”. The following framework illustrates the overall organizational culture audit framework uses as guide to this study. However, the development of actions/interventions (phase 2) and evaluation/redirection (phase 3) of desired culture will only commence subject to organizational request and will not be covered in this study. The proposed system will only be involved in data collection, analysis and identify gaps and then recommend interventions.

3.4. Interaction

The proposed organizational culture audit system will be developed using a human factor based approach with user-friendly interface that provides easy and friendly interaction between user and system to replace the manual auditing system. A physics engine is to control the interactive user interface. The physics engine makes sure that the rendered geometry is contained in the front space frustum to exclude the issues. This system will also allow color picking algorithm that interact with the user interface.

The picking and selection algorithm will be implemented using the object’s alpha color values. However, this restricts the use of blending. Implementing this is important and it gives a hint of how to implement more

sophisticated selection methods. When the user presses the joystick button or touches the object, the cursor's current location pixel's alpha value will read and then checked to determine whether the alpha value match the virtual object's alpha value. The reading of the selected pixel's alpha value will be accomplished with the following command:

```
glReadPixels( iCursorPosX, iCursorPosY, 1, 1, GL_RGBA, GL_UNSIGNED_BYTE, &aPixel );
glReadPixels( iCursorPosX, iCursorPosY, 1, 1, GL_RGBA, GL_UNSIGNED_BYTE, &aPixel );
```

The first two arguments define the lower left corner of the rectangle where the pixels are read. The next two arguments define the width and height of that window. The fifth and sixth arguments are the format and type of the pixel data and the last argument is an array pointer where the pixels are stored.

3.5. System Design

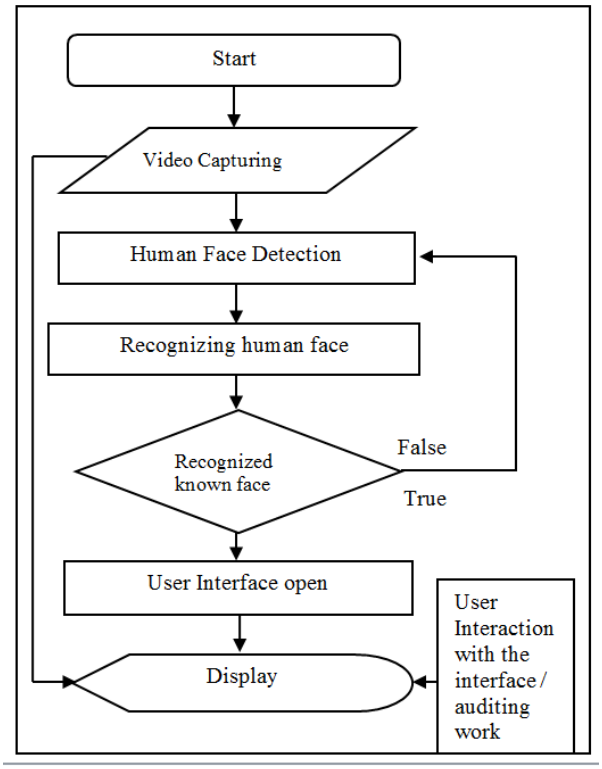

Fig.1. Flowchart of the online audit system

Figure 1 shows the total flow of the to be system. At first video capturing is started and sample video will be grabbed by using system's camera. At this time user will be able to see the real time video on screen. Then this sample video will be further processed by facial recognition algorithm based image processing task to recognize the human face. If known human face will be recognized, the user interface will open and the user will be allowed to interact with the system.

4. Discussion and Future Work

This proposed facial recognition online organizational culture audit system should bring a new era in organizational culture auditing. It will provide a more secured auditting envoronment and provide a new experience for both auditors and auditees. Culture audit is a very complicated and challenging task to perform but the human

factors based approach should be able to make the task much easier to accomplish. The system should be easy to use and the auditing work should in return be much cheaper and less time to conduct.

This system should also bring some significant contributions from the field of Human and Ergonomic Factors, since the system will be build on the basis of Human where face perception is the process by which the brain and mind understand and interpret the face, particularly the human face. Understanding the human brain and mind is a part of Cognitive Ergonomics. The human face's proportions and expressions are important to identify origin, emotional tendencies, health qualities, and some social information.

Our plan is to ensure that this online audit system could produce intelligent output and friendlier to use by organization of any nature. It is expected that the output from this system could also be used to measure how far an organization's behavior matches its expressed values. This knowledge should be useful to determine organizational strategic direction. It is also expected that this online auditing system could help minimize whatever error and difficulties faced in manual auditing.

5. Conclusion

The birth of this online culture audit system could be an integral part in future organizational culture auditing. In addition to that its interactive facial recognition auditing system could further provides for more secured online auditing experience. This system should allow the auditor to interact with user interface and perform auditing work without having to visit the organization in person to perform the audit.

Findings on organizational culture sub-dimensions audit report (Company ABC)

Participant Characteristic	HQ (N = 0)		Kuching (N = 3)		Kota Samarahan (N = 5)		Sri Aman (N = 0)		Betong (N = 0)		Saratok (N = 0)		Total
	N	%	N	%	N	%	N	%	N	%	N	%	
1. Gender													
Male	0	0	3	100	5	100	0	0	0	0	0	0	8
Female	0		0		0		0		0		0		0
No information													
2. Age	Mean = 0		Mean = 34		Mean = 31		Mean = 0		Mean = 0		Mean = 0		
3. Race													
Malay	0		1		1		0		0		0		2
Chinese	0		0		1		0		0		0		1
Indian	0		0		0		0		0		0		0
Iban	0		0		1		0		0		0		1
Bidayuh	0		0		0		0		0		0		0
Melanau	0		0		0		0		0		0		0
Orang Ulu	0		0		0		0		0		0		0

Fig.2. Screenshots of online Organizational Audit System

Acknowledgements

We would like to express our appreciation to the Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak (UNIMAS) for providing the opportunity and facilities to completing this study.

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